ABSTRACT OF THE DISCLOSURE

A novel supported mesoporous carbon ultrafiltration membrane and process for producing the same. The membranes comprise a mesoporous carbon layer that exists both within and external to the porous support. A liquid polymer precursor composition comprising both carbonizing and noncarbonizing templating polymers is deposited on the porous metal support. The coated support is then heated in an inert-gas atmosphere to pyrolyze the polymeric precursor and form a mesoporous carbon layer on and within the support. The pore-size of the membranes is dependent on the molecular weight of the noncarbonizing templating polymer precursor. The mesoporous carbon layer is stable and can withstand high temperatures and exposure to organic chemicals. Additionally, the porous metal support provides excellent strength properties. The composite structure of the membrane provides novel structural properties and allows for increased operating pressures allowing for greater membrane flow rates.

The invention also relates to the use of the novel ultrafiltration membrane to separate macromolecules from solution. An example is shown separating bovine serum albumin from water. The membrane functions by separating and by selective adsorption. Because of the membrane's porous metal support, it is well suited to industrial applications.

The unique properties of the supported mesoporous carbon membrane also allow the membrane to be used in transient pressure or temperature swing separations processes. Such processes were not previously possible with existing mesoporous membranes. The present invention, however, possesses the requisite physical properties to perform such novel ultrafiltration processes.

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